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EXHIBIT A CONCEPTION FROM URIBE NOTEBOOK

Table 1. RCA Type II Catalyst Performance Measured as Voltage Loss at $0.6~\text{A/cm}^2$. Fuel composition: 100 ppm CO/H₂ + air bleed.

Cell ID	Page in	Material	Source	Load	mV	mV
	notebook			mg/cm ²	(4%air)	(6%air)
TF 385	145	Sn	Janssen	0.72	150	105
TF 361	131	Mo	Alfa Aesar	1.00	125	70
TF 365	129	Cu cat	Engelhard	1.30	43	36
TF 353	123	CuO (a)	Alfa Aesar	1.87	55	25
TF 362	121	W	Johnson Matthey	1.30	75	25
TF 359	128	Cu	Alfa Aesar	4.00	45	25
TF 389	149	TbOx(III,IV)	Alfa Aesar	0.72	30	22
TF 345	120	CuO	Johnson Matthey	1.47	30	20
TF 356	127	CuO (ac)	LANL prepared	0.79	35	10
TF 373	140	Fe ₂ O ₃	Alfa Aesar	0.32	22	9
TF 372	141	CoOx(II,III)	Johnson Matthey	0.72	· 44	8
TF 357	126	CuO/ZnO	United Catalysts	1.82	35	5

EXHIBIT B TABLE OF EXPERIMENTS AND RESULTS (Reduction to Practice)

Durang with Pt For #22-97 (Book of inks) Dry ink: 18.2 % Pt. (For 5 micells) Backing sniface: 9.6 cm² Amount sought for 0.3 ng Pt/au (dyink) = 15.8 ng Actual amount Note: This ink appears to have too much Teflon. Not used any more New ink for backings. 30 July 97 0.7017 9 20% Pt on Valcan XC-72 (ETEK) 3.5 ml "Teflon 120" surprision (0.02 g solid/ml) 0.840 g glycerol 5.0 ml isopropanol - Socication for 10 min. - Bar stirring for 12 hrs. (overnight) Use of non-precious metals catalysts on the backing: Idea: Improve CO-tolerance with air bleeding using non-precious metal basescatalyst Ex: WC, metal oxides Ink preparation : next page / Reviewed by Fernando Coazon

EXHIBIT C FUEL CELL ANODE INK COMPOSITIONS FROM URIBE NOTEBOOK

WC backing layer 9/25/97 Backings weights (after heating at 280°C for 15 min) Cloth size: 3.15 x 3.15 cm2 = 9.92 cm2 0. 0.2322 g 1. 0.2309 g Painting ink o. 2 layers painted Weight's after painting & heating @ 280°C for 20 min whole Ar mg CVC/un2 1.7 wedin 77-344 0.0.2503 0.0181 1.0.2471 0.0162 2. 0. 2497 1.4 0.0158 W backing layer 10/1/97 0.4000 g W (JM Alfa, Puratronic) 0.0344 g C black (Vulcan xC72) 0.546 g g/ycerol 1.9 ml "Teflon 120" suspension (002 g solids /ml) - Sometion for 10 min - Bar stirred overnight = Various layers of the ink painted on a ETEK uncatalized toth (air dry inletween layers) suttred @ 280°C for 15 min W= 1.3 mg W/am2 Used in FC: TF 362 C:0.17 sugglunt

	280041
	Cut + 2n0 (G66B) Catalyst
	Ink preparation:
	0.4005 g. CuO-ZnO (G663, Zooinesh)
	0.0350 9 (- black (Vulcan XC-72)
	0.4215 g glycerol
	1.9 ml "Teflon 120", suspension (0.02 g solids/ml)
	
	- Sancto d In in in
	- Somicated for 10 min - Bar stirred overnight
	G66 B Composition 7.
	•
	Cu0:33
	Zu0:65
\dashv	A1203: <2
1	Dry ink composition
1	- Composition of
	G66B: 84.6 %
-	C-black: 7.4 %
\dashv	Teflon: 8.0 %
\dashv	For TF 357 backing
\top	
1	blank (E-TEK) = 0.2231 g
	+ dryink(280°() = 0.2445 g
+	0.0217 3
+	G66B = 1.82 mg/cm²
	CuO = 0.60 mg/am²
+	Result: Full Co (100 ppm) tolerancem
\dashv	with 6% sir bleeding
\exists	

۲,

		Backing preparation for FC: 1F356
		CuO (from acetate; ink 10/22/97 page 125)
		ETEK blank = 0.2253.9 (studend) (non catalized, heated @ 280°c for 15 min)
		(non catalized, heated 6 280°c for 15 min)
	,	+ dry ink = 0.2396 g

		CuO(acotate): 0.79 ing CuO/cm²
<u> </u>		Result: Full Tolerance to 100 ppm CO + 6 Joain
		Result: Full Tolerance to 100 ppm CD + 6 Your File: FCOCT97 Run 395 & 378
		3Nov97
-		Backing municipality for FC: TEd 358
		Backing preparation for FC: TFQ 358
<u> </u>		and the same
		Cul (fram acetate, ink 10/22/97 pag 125)
1		F-TEK Intalic standard - 12001 0
-		E-TEK black (standard) = 0.2284 g (heated @ 280° (for 15 min)
		blank + dry ink = 0.2489 g (55% Cu0)
1		
		dry ink = 20.5 mg
		CuO (acetate) = 1.14 mg/cm²
		Used in FC: TF358
		Paret Paret to a mariful
£300		Result: Poor tolerance to 100 ppm CO
-		,
	<u>.</u>	
1		

5 Nov 97.
Juk preparation with Cu-catalyst (Engelhard) X
(This catalyst is used for purifying
glove boxes)
0.4000 g Cu-cat. (powdered in a mortar)
0.0340 g C-black (Vulean xC-72)
0.4094 g glycerol
1.00 ml isopropanol 1.9 ml "Teflon 120" suspension (0.02 g solids/me)
- Somicated for 10 min
- Bar stirred overnight
Backing preparation
ETEK std blank: 0.2339 g
+ dry cat. ink: 0.2542 g
0.02039
2 mg catalyt/cm²
* Encoller 1 . Cu and 1111 =
* Engelhard: Cu-0226 514×20
(Cu catalyst) Prod Code 05372400100
Test on FC: TF 365

	6NOV 97
	Backing with Mo
Anathra and a substitution of the substitution	Mo-powder (Alfa products) - 100 mesh
	3.0 000000
	Ink preparation:
	The properties.
	Plica a G M
	0.4000 g Mo
	0.0342 g C-black (Vulcan XC-72)
	0.4245 g glycerol
	1.9 ml "Teflox 120" supention (0.02 g Solids/nel) 1.0 ml isopropanol
Burganeser and the shares and the shares are shares as the shares are s	1.9 ml "Teflox 120" suspension (0.02 g Solids/ml)
	1.0 ml isopropanol
(×)	- Somicated for 10 min
(*)	- Bar stirred overnight
)	
	Baking negaration
	Backing E-TEK Std. = 0.2336 9
	+ Mo ink (280%/5min) = 0.2452 9
	Backing E-TEK 4td. = 0.2336 g + Mo ink (280%/5min) = 0.2452 g Dry Moink 0.0/16 g
	Mo: 1.0 mg/am²
3	70 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
	Used in cell TF 36/
7 .	
1	

	Call TF 380 918 march	98 98
	Anode Backing with La CoO3 (from Fern	anclo G
and the second s	Took preparation:	Dry Tuk %
	0.2004 6 / - 0.0	0.
	0.2001 g La CoO3	8 <u>5</u>
a para di tanàna ny faritra dia mandritra di tanàna dia mandritra di tanàna di tanàna di tanàna di tanàna di t	0.0170 g Vulcan XC 72R	
	950111 "TOPPON 120"5 WILL (20 23 25/11/20)	Ż.
	0.3202 g glycerol 950 pl "Teflon 120" suspension (0.0 z gsolids/ml) 0.5 ml isopropanol	
	- Somicated for 10 min	
	- par stirred overnight	
		continues and the state of the second and the secon
	Blank: 0.1978	
	+ Laz Co-03 ink: 0,2/20	
	Dryink : 0.0142	
	1.22 mg La CoO3/cm² Used in 7F380	
AND THE RESIDENCE OF THE PROPERTY OF THE PROPE	Cell TF385 18 M	arch 98
9	Anode Backing with Sn (Janssen)	
	January Will Sh (January)	
and the second s	Ink preparation	> /
		Dry ink
	0.1003 g Sn provder	70 %
	0.03/1 g Vulcan XC72R	22°%
	0.3422 g glycerol	8
,	575 ML Toflon 120 sugression (0.02 g solids ful)	8
	0.03/1 g Vulcan XC 72R 0.3422 g glycerol 575 pl "Toflon 120 supension (0.02 g solids/pul) 0.5 ml isoproparol	- Part Maria III in a record of the second distribution of the second of
	- Somicated for 10 min	
	- Bay stirred overnight	-
1	Sul or circum	
	Blank: 0.1897 g	
	+ Snink: 0.1972 g	
·	dry ink: 0.0075 g	W.
	0.53 mg Sn/an ; Wed in	0000-30:

EXHIBIT D EXEMPLARY FORM OF TEST DATA FROM URIBE NOTEBOOK

info 0

FCOCT97

0,25

SELECT PLOT

0,22

VCELL

read

0.00

FILE

0

1.0-

0.9-

0.8-

0.7

0.6-

0.5-

Ø.4-

0.1

0.000

0.200

0.400

0.600 0.800 CURRENT A/cm^2

<u>1,0</u>00

1.200

1.400

1.600

1.800

85%



TF345, 10/01/97, N105, A:

80/105/90

FILE INDEX, RUN NO.

0,29

Backing: 1.45 mg CuO/cm/2

date ____time 10/2/97 10:44

0,33

0.23mg Pt/cm^2, C:0.27mgPt/cm^2, PSIG:30/60,

5.000

0,36

TF345, 10/01/97, N105, A:

80/105/90

0,-1

NUMBER OF FILES

0,-1

100 ppm CO + 2% Air 100 ppm CO + 4% Air

100 ppm CO + 5% Air

neat H2 100 ppm CO

0.23mg Pt/cm^2, C:0.27mgPt/cm^2, PSIG:30/60,

10/2/97 9:59 AM 5.000

0,-1

RUN NUMBERS

SPREAD SHEET

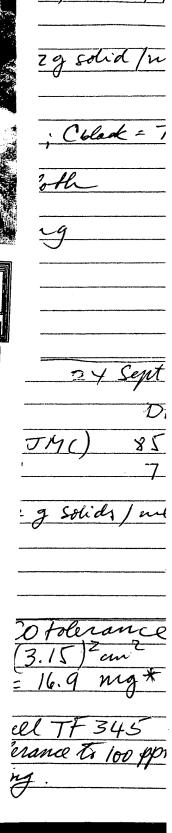


EXHIBIT E <u>LABORATORY TEST STATION LOG BOOK PAGES</u>

## 1945 Station 3 NIOS/A; 0.23 mg M/cm² (0.197 C:0.27 mg M/cm² Backing: 1.45 Ca O/cm² C:0.27 mg M/cm² Bolios/90 Bolio			
Backery: 1.45 [a 0/cm² PSI4 Tc/Th /Th Oct / Vell Fr Oct / Oct			TF 3451 Station 3 N105/A; 0.23 mg Pt/cm2
Backing: 1.45 [in 0/cm² PSI4 Tc/Th /Th Dot 16/25 PSI6 Tc/Th PSI6			10-1-97 / C:0.27 mg Pt/cm2
Details Colored Fr. PSIC Tetts 1/2 Details Colored Fr. PSIC Tetts 1/2 Details Sill Station of the colored Fr. PSIC Tetts 1/2 Sill Station Colored Fr. Details			Backing: 1.45 Cu O/cm2
3:11 BR6:10.79 HFR:0.147 OCV:0.97 9:05 100 pp m (D H2:158, CO:1.6 sccm 10:50 CO off. 10:50 100 pp m CO + 2 to Air 11:40 CO & Air off 12:18 CO & Air off 2:10 pm 100 pp m CO + 4% Air 3:18 CO & Air off 2:10 pm 100 pp m CO + 5% air Shirting dum test complete 90 7F 349 Station 3 N109 A:0.21 mg Pt pm² 10/2/97 C:0.24 mg Pt/m² 10-3 8:37 6.41 0.50 164/550 30/60 80/105/90 5RG:10.88 HFR:0.127 OCV:0.99 7F 345 St. 3 10/6 6:10 Cell Ne-assembled and new test started. 9:03 3.87 A 0.5 160/550 30/60 80/105/90 5RG:10.71 HFR:0.113 0CV:0.99 10/7 8:16 457 0.5 160/550 30/60 80/105/90			
3:11 BR6:10.79, HFR:0.147 OCV:0.97 9:05 100 ppm (D H2:158, Co:1.6 sccm 10:50 CO off. 10:50 100 ppm CO + 2 To Air 11:40 CO & Air off 12:18 CO & Air off 2:10 pm 100 ppm Co + 4% Air 3:18 CO & Air off 2:10 pm 100 ppm Co + 5% air Shirting dum test complete 70 77 Station 3 N109 /A:0.21 mg Pt/m² 10/2/97	<u>'L</u>	•	date time Cd Vell Fr, PSIG To Th T.
9.05 100 00 M CD H2:158, CO:1.6 sccm 10:00 CO off. 10:50 100 ppm CO + 2 % Air 11:40 CO & Air off 12+to 12:25 100 ppm CO + 4 % Air 13:18 CO & Air off 2:10 pm 100 ppm Co + 5 % air Shuting dwn & test complete 90 10/2/97 10/2/97 10-3 8:37 6.41 0.50 160/550 30/60 80/105/90 3.66 10.86 HFR:0.127 OCV:0.99 TF 345 St. 3 10/6 6:10 Cell re-assembled and new Test started. 9:03 3.87 A 0.5 160/550 30/60 80/105/90 586:1071 HFR:0.13 0CV:0.99 10/7 8:16 457 0.5 160/550 30/60 80/105/90	2	and different construction and analysis of the second construction of the s	10-2 8:10 5.47 0.5 160/550 30/60 80/105/9
10:50 100 ppm CO + 2 % Air 10:50 100 ppm CO + 2 % Air 11:40 CO & Air off 12-15 12:25 100 ppm CO + 4 % Air 13:18 CO & Air off 2:10 pm 1000pm Co + 5 % air Shuting dwn & test complete 70 10/2/97 10/2/97 10-3 8:37 6.41 0.50 100550 30/60 80/105/90 5RG 10.81 HFR:0.127 OCV:0.99 TF 345 St. 3 10/6 6:10 Cell re-assembled and new test started. 9:03 3.87 A 0.5 160/550 30/60 80/105/90 5RG:10.77 HFR:0.13 0CV:0.99 10/7 8:16 457 0.5 160/550 30/60 80/105/90			3:11 BRG: 10.79, HFR: 0.147 OCV: 0.47
10:50 100 ppm CO + 2 % Air 10:50 100 ppm CO + 2 % Air 11:40 CO & Air off 12+to 12:25, 100 ppm CO + 4 % Air 13:18 CO & Air off 2:10 pm 100 ppm Co + 5 % air Shuting dwn # test complete 90 10/2/97 10/2/97 10-3 8:37 6.41 0.50 100 550 30/60 80/105/90 5RG 10.81 HFR: 0.127 OCV: 0.99 10/6 6:10 Cell re-assembled and new 10/6 6:10 Cell re-	3.		9:05 100 pp M CO H2:158, CO: 1.6 sccm
11:40 CO & Air off 12:15 100 ppm CO + 4% Air 13:18 CD & Air off 2:10pm 100ppm Co + 5% ain Shuting dwn It test complete 90 75 Station 3 N/08/A:0.2/mg Pt/m² 10/2/97 C:0.24 mg Pt/m² 10-3 8:37 6.41 0.58 166/550 30/60 80/105/90 76 7F 345 St. 3 10/6 6:10 Cell Ne-assembled and new Test started. 9:03 3:87 A 0.5 160/550 30/60 80/105/90 586:10.77 HFR:0.163 0CV:0.99 10/7 8:16 4:57 0:5 160/550 30/60 80/105/90			10:00 CO OFF.
11:40 CO & Air off 12:15 100 ppm CO + 4% Air 13:18 CD & Air off 2:10pm 100ppm Co + 5% ain Shuting dwn It test complete 90 75 Station 3 N/08/A:0.2/mg Pt/m² 10/2/97 C:0.24 mg Pt/m² 10-3 8:37 6.41 0.58 166/550 30/60 80/105/90 76 7F 345 St. 3 10/6 6:10 Cell Ne-assembled and new Test started. 9:03 3:87 A 0.5 160/550 30/60 80/105/90 586:10.77 HFR:0.163 0CV:0.99 10/7 8:16 4:57 0:5 160/550 30/60 80/105/90		-	10:50 100 ppm CO + 2 % Air
2:10pm 100ppmCo + 5% air Shuting durn that complete 90 7F34\$ Station 3 N10\$ A:0.21mg Ptpin? 10/2/97 / C:0.24 mg Ptfun? 10-3 8:37 6.41 0.5\$ 164550 30/60 80/105/90 5R6:10.86 HFR:0.127 OCV:0.99 7F345 St. 3 10/6 6:10 Cell re-assembled and new Test started. 9:03 3.87 A 0.5 160/570 30/60 80/105/90 5R6:10.77 HFR:0.163 0CV:0.99 10/7 8:16 4.57 0.5 160/550 30/60 80/105/90			11:40 CO & Air off
2:10pm 100ppmCo + 5% air Shuting durn that complete 90 7F344 Station 3 N108 A:0.21mg Ptpm? 10/2/97 / C:0.24 mg Pt/m? Backing: 1.9 mg CaO/an? 10-3 8:37 6.41 0.58 166/550 30/60 80/105/90 5R6:10.88 HFR:0.127 OCV:0.99 7F345 St. 3 10/6 6:10 Cell re-assembled and new Test started. 9:03 3.87 A 0.5 160/570 30/60 80/105/90 5R6:10.77 HFR:0.163 OCV:0.99 10/7 8:16 4.57 0.5 160/550 30/60 80/105/90			12:16 12:25 100 ppm CO + 4% Air
TF 345 Station 3 N/09 /A: 0.2/mg Pt/m² 10/2/97 / C:0.24 mg Pt/m² 10-3 8:37 6.41 0.50 160/550 30/60 80/105/90 2RG:10.81/ HFR: 0.127 OCV: 0.99 TF 345 St. 3 10/6 6:10 Cell Ne-assembled and new Test started. 9:03 3.87 A 0.5 160/550 30/60 80/105/90 5RG:10.77 HFR: 0.163 OCV: 0.99 10/7 8:16 457 0.5 160/550 30/60 80/105/90			13:18 CORAIN OFF
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7F 345 St. 3 10/6 6:10 Cell re-assembled and new test started. 9:03 3.87 A 0.5 160/550 30/60 80/105/90 5RG:10.77 HFR:0.163 0CV:0.99 10/7 8:16 4.57 0.5 160/550 30/60 80/105/90			
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7:03 3.87 A 0.5 160/570 30/60 80/105/90 5RG:10.77 HFR:0.163 OCV: 0.99 10/7 8:16 4.57 0.5 160/550 30/60 80/105/90			10/6 6:10 Cell re-assembled and new
9:03 3.87 A 0.5 160/550 30/60 80/105/90 5RG:10.77 HFR:0.163 OCV:0.99 10/7 8:16 4.57 0.5 160/550 30/60 80/105/90			test started.
SRG: 10.77 HFR: 0.163 OCV: 0.99 10/7 8: 16 4.57 0.5 160/550 30/60 80/105/90			
SRG: 10.77 HFR: 0.163 OCV: 0.99 10/7 8: 16 4.57 0.5 160/550 30/60 80/105/90			9:03 3.87 A 0.5 160/550 30/60 80/105/91
10/7 8:16 4.57 0.5 160/550 30/60 80/105/90 8:18 5R6:10.82 0.171 0CV:0.99			SRG: 10.77 HFR: 01/2 DCV: 199
8:18 5RG: 10.82 0.171 OCV'0.99			10/7 8:16 457 05 160/650 30/60 80/105/90
			8:18 SRG: 10:82 0.171 DAV'D 99
A			

	TE 35310 0	t. + ' G	1106 11 0.172	0+1. 7
	TF 353 1	cauon 2	N105 A: 0.17m	of leas 2
	10/22/97 Backing: Anode:	1.81 mg/cm2	C. O. C. Thorse !	Atd F-TEV
	Cucsury : mou.		(2002)	Day L IF L
	date / time Ci	l Vaill	Gr DS	if Teth th
	10/23 8:25 6.8	8 0.5	160/550 30	160 80/105/9D
9 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1				OCV: 0.97
	1) on (100 ppr		
		off.		
	11:03 6.5	0 0.5		
	11:37 C	on (100 ppr	n) air on	2 % Hz: 144, Co: 16, 19:13;
	12:30	O + ain	5 R	
	1:37 10	00 + ain a	2°40/0	
· · · · · · · · · · · · · · · · · · ·	2:33 C	0077		Ha Coa Air
	3.33 /	00 ppm (0 + a	ir 6% (9.6)	(Hz. (0. Am) (140.16.9.6) 30/60 B0/105/40
	4:20 C	OZAIV O	H-,	
	10/24 8:01 6.	69 0,5	160/550	30/60 80/105/90
	8:02 51	26: 13:03, HE	-K: 0.107	oev:0,97
	8:50 1	colon co	+ 6% air	± 1120C
·	9:43	CO OFF - K	+ 6% air aise Hz Humid	ung. 100
	11: 40 (Co as	0	
	1:45	Coeff	19 ai +4	: 1700
		100 ppin CO 4	+ 6% air Th	0/60 80/105/89
	8:19 5	PG: 13,02	HFR: 0.108	0CV.0.97
	2:45	70000	Boscin	
	10:30 1	00 ppm Co	H1 22 CO: 8.	O ·
		00 876		
	(A) (C)	1111 24	air	
	2:13 60	ON		
	3:05 18	roppm CO+	4% air	
	1:00 C	o off		
	10/28 8:12 6.	53 00.5	160/550 30	160 80/105/90
		RG: 12.98	HFR: 0.108	ocv: 0.98
	8:55 10	oppm Co + 6	70 air	
	7. 45	0 + air 5 ff_		
	Cont	on ps 115°		

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	TF356. Station 3 N105/A: 0.17 mg ft/cm2
	TF356 Station 3 N105/A: 0.17 mg ft/cm2
	10/24/47 / C.O.18 Mg ff/con2
gar ar van en her en	Backing A: 0.79 mg Cw O/cm², C: Std E-TEK
	date/time Cd Viell Fr 700 PSIG TC/Th/Ty 10/30 8:10 6.83 0.5 160/20 30/60 80/105/90
	10/30 8:10 6.83 0.5 160/20 30/60 80/105/90
	8:14 SRG: 10.94 HFR: 0.104 OCV: 0,97
	3: 45 100ppm CO
	9:44 CO or
	10:40 100 ppm CO + 2% air
	11:30 Coop
	1:30 100ppmC0 + 4% air
	2:20 COOH
lavalitelikusta tilden sämte alle en av samte sähr oppman och same en, sink varanden alleksen konst	3.07 100 ppm CD + 6% air
	2:20 CO 0H 3:07 100 ppm CD + 6% air
	4.00
	10/31 8:12 5.67 0.5 160/550 30/60 80/105/90
	8:20 SRG:10.94 HFR:0.103 OCV:0.99
	9.20 100ppm CO + 670 ais
	9:22 6.21 0.5
Northern Philip (1984), and the share a state of the stat	11:20 6.31 + 0.5 V Startia life test w/
	100ppmc0 + 6% an
1,40 hrs	12.40 6.40 0.5 - 10 + air 871
2.69	2 04 7,34 0.5 CO on lowon
3.18	2.30 0.39 0.0 6/0 au on
4.87	4:13 6.45 0.5 CO + air off
	4:18 Hz flow to: 80 sccm
	4:18 Hz flow to: 80 sccm 4:50 7.70 0.5 80/700 30/60 80/105/90
	11/3 8.22 4.97 0.5 80/700 30/60 80/105/90
	8:31 SRG: 10.93 HFF: 0.104 OCV: 0.97
	8:31 SRG: 10.93 HFR: 0.104 OCT: 0.97 Removing from station - for new test
	July Super Joseph

	TE 3531	station	5	Cont of	m ps	112	
		,		<i>-</i>			
MARGEMENT TO A STATE OF THE STA	date/time	<u>Cd</u> 6.52	Yw	u Fr	PS		Telta/Th
Street of fire and a second of the second of	10/29 8:31						80/105/98
The	8:34	SRG: 12.	96	HFR: 0.10	9	,00	V: 0,98
Hu Go	10/30 8:11	6.45	0.5	80/第	型 3	0/60	80/105/90
Official consistency is an automorphism of the second of t	8:15	SRG: 12	.95	HFR: 0.10	9	, OCV	1:0.98
interpretation of the state of	10/31 8:15			<u>80/5.</u>			80/109/90
of the figure on prints, or	8:19					00 V.	0.98
ADVISOR AND	4.13	6.45	0.9	5 80/5	50	30/60	80/105/90
Management and the second and the se	420	==#\forall		namentalistika ja januarian ja			magazina sancangama wana anna sancanga penamban sancanga panamban sancanga panamban sancanga panamban sancanga
	11/3 8:30	6.35	0.5	8015	550 3	0/60	80/105/90
OF BO COLD LOCK TO K. 1	8:32	SRG: 12	.90	HPR:0,	109	œv.	0.98
Final design of the control of the c	11/4 8:00	6.41	0.5	80/5	50	30/60	80/105/90
former may a supplementary and a supplementary	8.03	5RG:12	. 89	HFR:0.1	09	oev:	048
105/90	<u>8:30</u>	no Az f	lowing	Thriv 1	uks c	ontroll	4 -
		chaid bar	ib to	Rotometes	@ 160		
THE REPORT AND A LOCAL TO THE REPORT AND A R	11/5 8:07	6.26	0.5	160/59	20		80/105/90
iofic	8:09	SRG: 12	1,87	HFR: 0.1	12	OC	1:0.98
Анаба А. Ана Ка Ка ,	10:40	MKS CE	ntroll	is thee	ped-	every	Thing
		OK -	witch	led to re	forma	il set	HZE BOSCH
	11/6 8:25	6.07	0.5	80/5	50	30/60	80/105/90
· ·	8:34	5RG: 12	.87	HPR:0.11	1	OC V	1:0.98
	3:12						80/106/90
AAAR War oo A - A - A - A - A - A - A - A - A -							
	Thulling	y dwn	Sle	ation I	& r	eplac	
						/	
,	: Cell -	Jesting	Com	peeti			
es administrativo de la companya de				/			
materials refer to the second							
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*** ** ** ** ** ** ** ** ** *** *** **	e normalisation in the company of the approximation of the company						·
A CONTRACTOR OF THE CONTRACTOR							
to the re- the state of the sta	anne phina dan madephinana, ann ao faoir a dan manainmeann ann agus agus agus agus agus agus agus agus		aperior a que que comerciamente dos como enformos primeros enforma-	· · · · · · · · · · · · · · · · · · ·		angang paguagan galaman gang papung bersahin sa 1939	
					er og værene ærti. De værene erte erte ærtige ærtige yd	an fi a bha a an fha an	
THE RESERVE AND THE PARTY AND					*******		yy y y y y y y y y y y y y y y y y y y

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	*	TF-3.57	Station 3	N105 A: 0.19m	ng lt/cm2
		11-3-97	, 	C: 0.23 n	neltlan2
		Backing A: 1.	82 mg 666B/cm2	, C. Otd. E-TEK	
	ain set 45		Trace control of the second se	To control and the control and	
5	-	date time	Cd Vall	Fr PS1G	Tetto the
2		11/4 8:59	5.35 0.5	160/550 30/60	• •
	wrong	00 801	SR6: 14.25	HFR: 0.173	DCY:0.49
	0	0 8:02	5RG: 10:93		ocv: 0.99
a.		8:35	100 ppm CD	одину ра 🎜 - _{во} дину до расти у два одружите на седу у досери од - принстуру в состава с стинисти на сели настинисти сели на с	
1		9:23	COOM		
		9:20	100ppm CO	+ 2% air	N .
**************************************		11:15	Co off		, , , , , , , , , , , , , , , , , , ,
in the second se		12:15	100 ppn Co	+47, air	
		\$.06	1000		ANNAN MENENEN MENENEN ER
-		200	100ADM CO	+ 6% air	
90		2155	COSH		gapanan da andre anno anno anno anno anno anno anno de chaire de chaire de la distribución de la descripción d
	а— оши сто по дост у доступно при то просто стором стором об просто об прос	3.40	14, 1120°C		
		4:30	100gpm C0+	- 6% air	
		11/4 8:06	5.81 0.5	160/550 30/60	80/105/90
		9:08	SRG: 10.92	HFR: 0.107	0cv:0.97
		8:33	THO: 120°C		•
		9:30	100 ppm CD +	4% ais @ 120	°c TH2
		10:40	COOP		,
		10:45	100ppm 0	Q @ 120°C	
ì		10 45	Pemoved of	from Station	
		test	Complete		
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Parage					
	and the second s				
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	~ .			
	TF359	Station 5	N105/A 0.18	mg Pt/cm2
	11/6/97		1C: 0.227	ng It /com2
Approximation continues and co	Backing A: 4	ma Culami, C	: Old E-TEK un	cut.
	\ O'			
	dati/time	Cd Vall	er PS19	- TelThITh
	11/7 8:05	6.65 0.5	160/550 30/6	80/105/90
	8:08	5RG:12.86	HFR: 0,111 20,1% CO in Hz	OCV:0.97
waassaassa akan saran sara	50	100 ppm Co	10.1% CO in H2	(140 · 16 10)
	10:45	(20 8 18		
\$000000 to 10000 months to 100	1:15	100 ppm +	2% air	·
and the state of t	2:10	Co off	•	
	3:03	100 ppm CO +	-4% air	
	3;50	CO'OH		
	11/10 8:16	5.66 0.5	160/50 22/6	0 80/105/90
	8:21	SRG: 12.83	HFR: 0.121	cv:0.97
	8:50	100ppm C0+	6 % au	
	9:50	Co of		
	10:48	the Chigo	Hz temp: 12	0 %
	11:35	100ppm CO	Hz temp: 12	
	12:30	CO 021		
	1:33	100 pm CD	+ 6 % air	
	2:52	Coop		The defended in the substituted with which was the substituted and the substituted a
***	11/12 8:06			0/60 80/105/90
	8:09	SRG: 12.19	HFR: 0.119	OCV:0.97
		Shutting all	I dun - rus	www
	from 5	tation		<u> </u>
			er 1985 vilka v	
			Tida dalah sada dajah sagat	
Samuel and the samuel				
		aan agan uggin uggin uggi vasi) tasun sibu sibu ugu sabasa sabasa sabasa sabasa sabas sabas sabas sabas sabas		
			they with and they was a result or marks of the collection and the col	
		and a supplication of the		
		- and - control with the control of the party and processing the control of the c		
CO. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10				

		•		
	TF3617 /	tation 5	N105/A: 0.15 mg	Pt/cm2
			N105/A: 0.15 mg	Pt/cm2
	anode Back:	1.0 mg Molanz,	Cathodi Stel E-	TEK
		0 1	The second secon	Contracting the second
	date time	Cd Vall	Fr PS16	Te /Th /Th
	11/14 8:12	Cd Yall 5.47 0.5	160/70 30/60	80/105/90
	8:17	SRG: 12.75 HFR	2:0,104 00	2V:0.97
	B: 48	los pom co	112:144 (0:16.2	
	9:43	CO OTA	•	
	10:40	100 ppm CO +	2% ain H2:144	Co: 16.0 Air 3.2
	11: 37	(0 DA		
	12:30	10000m Co +	4 % air	THE REAL PROPERTY OF THE PARTY
	1. 36	Co off		
	2:36	100pm C0 + 1 100ppm C0 +	6% air	
	11/17 2:05	5.26 0.5 16	0/550 30/60	80/10/90
	2:05		R: 0.107 C	
·	1			
		100 ppm CO on		
	4:45	Co off		,
	6:30	CO (100 ppm) + 6 9	edir on	
	7:26	CO & Air off		5 ° C
WARNES WAS A MARKET WAS A STATE OF THE STATE	11/18 \$:59	4.90 0.5	160/550 30/60	80/105/90
·	8:02	SRG: 12.72 HFR red from (D. 106	oc v:0.97
	Remor	red from	station- te.	2t /
	Co	mplette!		
		V		
telefolis-orientaria antique e entique papares pour entique de constituir de constituir de constituir de const				
	,			
	·			

Appear and the contraction and	TF3621	Station 5 N105/A: 0.15 mg Pl/con 2
Tall to the second second	11/18/97	Station 5 N105/A: 0.15 mg Pt/con =
And the second s		1.3 mg W/cm2
the styling to a significant statement of the styling of the styli		
The second secon	date/time	Ed Vred FR PS16, Te/Th/T
	11/19 8:00	6.59 0.5 160/550 30/60 80/105/9
and considered the second seco	9:25	SRG: 12.71 HFR: 0.121 DCV: 0.97
Advisor and the second of the	9:15	100ppm CO (Hz: 144, CO: 1610 sccm)
ò	/0:30	Co off
	11:25	100 ppm co + 2% ais (Hz: 144, CO: 16.0, Mr: 3.2) sciu
}	12:25	Cooff
Applications of the control of the c	1:30	100 ppm CO + 4% air
Access to the state of the stat	2:20	$\mathcal{CD}^{\bullet}\mathcal{O}_{\mathcal{A}}$
entertainment and the	3 18	100 ppm CO + 6 % air
	4.05	6.64 0.5 160/550 30/60 80/105/
	11/20 8:00	
1	8:09	5RG: 12.67 HFR: 0.126 CV: 0.98
	<i>8</i> : 30	THZ: 120°C
	9:30	160ppm Coon
80	10:21	CO off
	1, 38	100 ppm CO + 60/0 ais
	2:30	COST
	3:20	PSIG: 30/30, 80/105/40, 80/550 scen
	11/21 B:15	5.80 0.5 80/550 30/30 80/105/90
Tributanta de aris ariska a a a a a a a a a a a a a a a a a a	8:22	SRG 12.72 HFR: 0.131 OCV: 0.97
	8:50	100 ppm CO (H2:72, Co: 8.0)
	9.45	100 ppm CO (Hz: 72, Co: 8.0)
	12:50	180 ppm CO + 2 % ais
	1:40	Cosu
80	11/24 8:06	5.88 0 0.5 80/550 30/30 80/105/90
80 180	8:10	SRG! 12.73 HFR: 0.119 OCV: 0.97
1	9:00	100 ppm CO + 40 /o air
1 <i>8</i> 0	9:55	Co off
6	10,45	Open Circuit Vollay wrong entry
•	11.00	100 ppm CO + 6% ais
· · · · · · · · · · · · · · · · · · ·	1:00	Co off
	The second section of the second section of the second second second second second second second second second	bond on Pa 129

TF 362 M. 5 com fm pg 125 Clatiline Cd Kell Fr PS lor Tc 11/25 8:47 5.95 0.5 81/550 30/30 80/ 9:05 SRG: 12.45 HPR: 0.124 DCV: 0.97 1/90 11:03 H2 + 257.5 CO2 H2:80 CO2:27 1:55 CO2072 CO2074 1:51 CO2 & CO off 5/90 3:12 257.002 + 100 ppm (0 + 67.0 air 6 4:15 CO2 & CO off 4:29 Air off 5:30 5.85 Amp 0.5 V Shut down	105/90
11/25 8:47 5.95 0.5 81/550 30/30 80/30 80/30 5 \$RG: 12.45 HFR: 0.124 0CV: 0.99 11:03 H2 + 25% CO2 H2: 80 CO2: 27 11:55 CO2073 1:50 25% CO2 + 100 ppm CO 1:5/ CO2 & CO off 3:12 25% CO2 + 100 ppm CO + 6% air 4:15 CO2 & CO off 4:29 Air off	105/90
11/25 8:47 5.95 0.5 81/550 30/30 80/	105/90
9:05 SRG: 12.45 HFR: 0.124 OCV: 0.97 190 11:03 H2 + 2573 CO2 H2:80 CO2:27 11:55 CO2073 1:50 2596 CO2 + 100 ppm CO 1:51 CO2 & CO off 3:12 257. CO2 + 100 ppm CO + 676 air 4:15 CO2 & CO off 4:29 Air off	105/9 0
190 11:03 11:55 11:55 11:55 11:55 1:50 25% CO2 + 100 ppm CO 1:51 CO2 & CO off 3:12 25% CO2 + 100 ppm CO + 6% air 4:15 CO2 & CO off 4:29 Air off	7
190 11:03 11:55 11:55 11:55 11:55 1:50 25% CO2 + 100 ppm CO 1:51 CO2 & CO off 3:12 25% CO2 + 100 ppm CO + 6% air 4:15 CO2 & CO off 4:29 Air off	
1:55 COLOTE 1:50 25% COZ + 100 ppm CO 1:51 COZ & CO off 3:12 25% COZ + 100 ppm CO + 6% air 4:15 COZ & CO off 4:29 Air off	
3:12 257.002+100 ppm 60 + 67. air 4:15 00,2 00 off 4:29 Air off	
3:12 257.002+100 ppm 60 + 67. air 4:15 00,2 00 off 4:29 Air off	
3:12 25% CO2+100 ppm CO+ 6% air 4:15 CO24 CO off 4:29 Air off	
4:15 CO22 CO off 4:29 Air off	
4:29 Air off	
6:50 5 X 5 / Duran () 5 1/ \dark 1/ Arma	
190 Removed from station	**************************************
cell performany was never war good did no	+
entered on wrong pa (gv)	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
1.10 100 ppm (0 + 2% air	PRINCE CAPECIAL CONTRACTOR CONTRA
2:00 Cooff 2:50 CoppmCo+ 4º/0 aux	
2:40 PMLOT Trans	
3:40 Co of the rain /	
	1105/90
- 8:18 SRG! 10:99 HFR: 0.100 OCV.'O,"	99
	30/105/90
8:51 SRG: 10.95 HFR: 0, 103 OEV: C	7.99
Removed from station	·)
U	
·	***
·	

-	F365 Station 5 N105/A: 0.18 mg Pt/cm2
	19/1/91 [C. D. 19 mg/x/am
	anode Back: 2.0 mg Englishard Cow-cat/cm2
	datiftime Cd Vell fr PSIG To MIN
	12/2 8:48 3.84 0.5 160/550 30/60 80/105/90
	8:51 SRG: 12.82 HFR: 0.204 OCV: 0.97 12/3 10:01 4.09 0.5 80/550 30/60 80/105/90
	12/3 10:01 4.09 0.5 80/550 30/60 80/105/90
	10:12 SRG:12.70 HFR:0.202 OCV:0.97
	3:30 100 ppm Co
	3:20 COOP
	4:22 SRG: 12.8 HFR: 0.209
	(set)
	4:40 HFR:0209 1 = 4.08 Th=105 V=0.6
	V=0.6 (42
	4:40 Tw (H2) = set @ 120°C
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	5:20 11 = 120 1 - 0.42 1 - 0.4
	5RG=12.8 (olt); HFR=0.168
	5:22 Th (1/2) set back @ 105°C
	12/4 7:58 3.96 0.5 80/550 30/60 80/105/90
	8:04 SR6:12.70 HFR:0.200 OCV:0.98
	8:49 100ppm Co + 2 % air
	9:37 CO 073
	9:37 CO 273 10:20 100ppm CO + 4% air 11:02 CO 373
	11:02 CO off
	11:55 100 ppm CO + 6% aus
	13 55 COVO OTA
	11:55 100 pm CO + 6% air 13:55 CO OFF Cell removed from station Cell performance was poor and did not improve
	Cell Deplormance was poor and did not improve
	·
	·
	·

!	7F369 Cont for pg 139 Station 3
	v = v
	<i>μ</i>
. ק'	1/14 10:40 394 0.5 160/550 30/60 80/105/90
	float is at 9 or 0,9
	Removed from station performance detelimeted
1	did not recover
	when diasunblich is small amount of material
	was lodged in flow field of anode- reasunbled
,	and current come up to 9.6 A at 0.50 mesented
FIO	ais at 6% for 10 min = \$ 5.24 A @ 0.5V
	1/15 Replaced with new cell
190	The superscript of the superscri
'	
90	TF 372) Station 3 NIOS/A! O.17mg Pt/cm2
(TF 3723 Station 3 NIO5 A! O.17 mg Pt/cm² (C: 0.18 mg Pt/cm²
190	Backing: Anod: 0.72mg CoD/un, Cuthode: Std ETEK
7	pacient go house of the column,
190	date time Cd Veel for PS16 Tetth th
1776	1/21 7:55 5.07 0.5 160/550 30/60 80/105/90
-6	8:01 SRG! 11.08 HFR: 0.106 QCV: 0.95
5/90	00 77
	11:50#155 100 ppm CO + 2 % ais
1	
ust	2:10 100 ppm CO + 4% au
2	3:00 CO off
	22 1 27
1	3:45 100 pm CO + 6% aus
:	
	1/22 8:03 6:76 0.5 160/550 30/60 80/105/90
	8:29 SRG: 11.05 HFR: 0.105 0CV:0.97
	1/23 8:05 6.96 0.5 80/550 30/30 80/105/90
· · · · · · · · · · · · · · · · · · ·	8:13 SRG: 11.07 HFR: 0.104 OCV: 0.97
	10:42 Reformation 200 scan
	11:40 reform of
	16:30 Reformate + 2 (o ais
	und an Pa 145
	7.6

	11-372 St. 3 Contfra pg 143
	1/20/98
ŗ	datiftine Cd Vrell Fr PS16 Tc/Tn/Th
	1/23 1:25 Reforment DB
	2:30 Reformat @ Evoscon + 4 % aun
	3:20 Reformate of
Ġ	4:10 Reform @ 200 s c c m + 6 % ain
	4:48 Reformato of
######################################	
***************************************	1 17.855
	10:05 Hz timp=120c
***************************************	10:47 6.55 70.5 80/550 50/60 80/120/90
	SRG: 11:09 HFR: 0.098 OCV: 0.97
	11:10 100 ppm Co or
	11 55 CO 57
-/a	1:00 Cell did not recover after 1 hr &
5/90	1:00 Cell did not recover after 1 hr of Co Being of turned on air purg at
	616
	1:30 100 P 2 70 an
	2:15 Coop air left or
·	3.05 1000pm CO + 670 ay
	3:50 Coop Hitemp decreased to 105
	1/29 1.38 5.91 0.5 80/550 30/60 80/105/90
	8.27 SRG:11.08 HFL:0.098 OCV:0.95
	9:55 Réformate 2005 cm
	4:95 Ref. 07
180	1:15 Ry + 2% ais
	2:00 RU 5H
1	3.00 Ref + 4% air
180	3:45 Ref 87
4	1/30 8:05 6.16 0.5 80/550 30/60 80/105/90
180	8:17 Sev: 11.09 HER: 0.099 OCV: 0.95
18	8:55 Ry + 670 air
	9:48 Ry off
	Cont on Pg 148

	1/26/98 Station 5 N109/A: 0.2 mg Pt/cm² (C: 0.21 mg Pt/cm²
-	1/26/98 /C: 0.21 mg Pt/cm2
M	
180	Backing: A: 0.32 mg Fez O3/cm², C: Std ETEK
180	date/time Cd Viell for PSIG TC/Th/Th
	1/29 8:21 5.09 0.5 160/550 30/60 80/105/90
0/80	8:30 SRG: 12.70 HFR: 0:104 001:0.97
3.7	112) 100 ffm CO (12.144, CO. 1610)
180	11:00 Co off
18	1:15 100ppm CO + 2 % air
80	2:00 Co 077
	3:00 100ppm co + 4 % air
0	3:45 CO 34
	1/30 8:07 5:13 0.5 160/550 30/60 80/105/90
30	8:19 SRG:12.73 HFR: 0.103 OCV: 0-98
1	8:55 100 ppm CO + 6 % air
	9:50 Co 897
	10:55 Hz flow at Boscom
	2:40 Reformate: 2005(cm
	3:45 Ref. 27
	2/2 8:15 5,49 0.5 80/50 30/60 80/105/9
	8:30 SRG: 12.73, HFR: 0.102 OCV: 0.98
	9:45 200 scen leformate + 270 ais
1	10:40 Ref off
,	11:50 200 scan beforest + 4% ais
	1:90 let 07X
	1:55 Forseun Reformate + 6% aus
	2:45 Red 578
	2/3 1:40 5.71 0.5 80/550 30/60 80/106/50
	7:48 SRG: 12.72 HTR: 0.105 OCV: 0.98
	2/4 8:10 5.50 0.5 80/50 30/60 80/105/90
	8:18 SRG:12.68 HFR:0:103, OCV:0.78
•	2/5 8.21 5.07 0.5 80/550 30/60 80/105/90
	8:33 5kg: 1265, HFR: 0.103 O(V:0.98
	9:25 Reformati @ 2005 com + 670 ais
	Cont on Pg 148
	Color off 170

	TF3.85	Station	4.2	N105 /A:	0.14 mg Pf	1cm2
******	4/24/98			1 c:	0.14 mg Pt 0.19 mg Ph	1/uniz
	Backing:	A: 0.53 mg	5n/cm2			
	1 1 uf _{res}	: Std Ur	eat. E.TE.	k	e enconstruct, spin-mine einhomidinen einhomid er var var varten eine eine van var var var var var var var var v	
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	Clate /time		Vrill	,		Telth ITh
	4/27 8:00			160/550		80/105/90
	8:10		1, HFR	10,105	ocv	: 0.97
~~~~	8:52	100 ppm	Co	 Oʻrtoyr intil tarihini senir qilaningi iliyotigi iri vi vi dahasi e vinilani iliyoti visi		
	9:51	Coops	THE ARTHUR TO THE WORLD TO THE WORLD	in and we will see the second of the second		
	11:45	100pp,	nCO + :	2°/0'ay		
***	1:00	• •				
a	2:15	IODAD	m (0+	4 % ais	and the second s	
	3:14	(0)	K			and a community of the
~~~~	4/28 7:57	6.8	0,5	160/550	34/64	80/105/91
NO. AMERICA	8:05	SRG: 7.	.14 H	FR:0.103	{	ocv:0.99
mae-acco	9: 35	100 ppm	· Co. + · (o lo ais		
	10:30				- The state of the	
okumer and	3:50	Rej a	lo Co			
	4/29 8:12	6.8	0,5	80 550	16/60	80/105/90
********	8:20	SRG:	7.71 , H	FR:0.103		ocv: 0.99
	8:45	Ref. W	/co:120	, H2: 80		
	9:46	Ref	534			
	10:41	Ref w/	100 + 2	To ais		
	11:18	Ref will CO FFG				
	12:55	Refark	0 + 43/	'ais		
	1:55	RJ of	<u> </u>		1	
	2:55	Ref w	100 + 6	% aus		
		dwn.	les	noved	from,	Station
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-		Taga			7.	
		TF 389 (5cm	¹) ₁ /H.	4-2 NI	05 A:0.19	mglt/cm2
	-	5/19/98			/ C: 0.20	mgPtlanz
	- 2	Backing: RC	A 0.72 mg cat. E.TEK	The /cm2		
		: Un	cat. E.TEK			
<u>.</u>		clate/tim	Ed Vull	fr,	PSIG	Tettu tin
<u>a</u>		5/20 7:49	6.3 0.5	160/550	44/60	80/105/90
·		7:59	SRG: 7.70	HFR:0.113		OCV: 0.97
track)		5/21 7:43	6.7 0.5	160/550	49/70	80/105/90
		7:53	SRG: 7.73	HFR:0.113		0CV:0.97
		5/22 7:42	6.1 0-5	160/550	42/58	80/105/90
***		7:44	SRG: 7.70	HPR: 0.116		OCV: 0.97
		5/26 8:03	5.4 0.5	160/550	45/65	80/105/90
***************************************		8:26	SRG: 7.72	HPR:0.115		0eV:0.97
****	*	5/27 8:00	6.2 0.48	160/550	32/58	80/105/90
		8:-26	SRG! 7.78	HFR:0.111		ocv:0.97
ī		5/28 8:20	6.5 0.48	160/550	33/62	
80		8:28	SRG: 7.72	HPR: 0.111	· · · · · · · · · · · · · · · · · · ·	OCV. 0.97
		6/1 8:23	4.9 0.59	160/550	16/60	80/105/90
Wallender State of the programme and the program			ORV: 7.66			OCV: 0.97
			Volt set at 0.5	reading 0,	59, pwrs	apply quit
		6/2 8:20	6.3 0.49	160/550	28/60	80/105/90
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		8:39	Chaing Re Bring back	or supply	on st	rtion
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		6/3 8:15	6.4 0.4	9 160/550	33/60	80/105/90
		8:25	SRG: 7.72,			oev:0.97
<i></i>		6/4 3:50	6.0 0.5	D 160/55	0 33/60	80/105/90
80		8:57	SRG: 7.74	HFR: 0.113		OCV: 0. 97
· · · · · · · · · · · · · · · · · · ·		1:50	100 pp m CO			
		3:05	Co M			·
		6/5 1:58	6.0 0000	160/55	0 30/60	
		8:21	SR6: 7.77	HFR: 0.113	3	oev: 0,97
		9:00	pur out	- air compress	or dwn	
		9:40	compress		·	
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18389) M. 4-2 (ond from for 2) Color Colo					C . 4	1 00 21
Ca Velle	TF38	39 7	St.	4-2	(.on)	frm fg
Control Cont						\
Compare Co + 2% ain Co 12:47 Co 13 Co Co Co Co Co Co Co C						OSIG TITTE
10 11 15 100 ppm CO + 2% an 12 47 100 ppm CO + 4% ain 12 47 100 ppm CO + 1% ain 12 100 ppm CO + 1% ain 12 100 ppm CO + 1% ain 12 100 ppm CO + 2% ain 12 10	date	Time C	d	Velle	<u> </u>	P310 101 1
2:47		11:55	DOPPM	CO + 2	% au	
2:95 CO 3/2 CO 3			MA OX	7		
2:45 CO off 0.5 16/5 50 30/62 80/105/91 4/8 8:15 4.7 0.5 16/550 30/60 80/105/91 8:25 SRG: 7.34 HFP: 0. 118 0ev 0.97 8:25 SRG: 7.74 HFP: 0. 118 0ev 0.97 6/0 8:07 4.4 0.5 160/550 32/60 80/105/50 6/10 8:07 4.4 0.5 160/550 32/60 80/105/50 6/11 8:18 5.6 0.5 160/550 30/60 80/105/50 6/11 8:18 5.6 0.5 160/550 30/60 80/105/50 6/11 8:18 5.6 0.5 160/550 30/60 80/105/50 6/11 8:18 5.6 0.5 160/550 30/60 80/105/50 6/11 8:18 5.6 0.5 160/550 30/60 80/105/50 6/11 8:18 5.6 0.5 160/550 30/60 80/105/50 6/11 8:18 5.6 0.5 160/550 30/60 80/105/50 6/12 8:51 Slev: 7.72 HFR: 0.117 9:30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		2:00	100 pp	mCO +	4% aus	
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6/0 8:07 4.4 0.5 160/550 30/00 80/105/40 8:12 SRb: 7.62 HPR: 0.116 OCV 0.97 6/11 8:18 5.6 0.5 160/550 30/00 80/105/40 6/10 53:00 100 0 pm 60 + 6 to air OCV 0.97 121 8:51 Slb: 7.72 HMR: 0.117 9:30 Ry w/co 120, H2 80 6/12 8:59 5.3 0.5 80/550 30/60 80/105/50 6/12 8:59 5.3 0.5 80/550 30/60 80/105/50 6/12 8:59 5.3 0.5 80/550 30/60 80/105/50 6/12 8:59 5.3 0.5 80/550 30/60 80/105/50 6/15 8:23 5.5 0.48 26/62 80/550 80/105/50 6/15 8:23 5.5 0.48 26/62 80/550 80/105/50 6/16 8:00 6-3 0.48 28/64 80/550 80/105/50 8:55 Ry w/co + 2°/0 air 1:05 Ry w/co + 4°/0 air		8:25	SR6: 1	1.74	HFL: 0, 118	22/10 8/105/90
8:12 SKG 7.60 HFK. O.19 6/10 8:18 5.6 0.5 160/550 30/60 80/105/40 6/10 53:00 100 ppm 60 + 6 16 air ocv 0.97 6/10 23:45 CO 360 entrad on wrong pg 16/11 8:51 Skg: 7.72 HFK: 0.117 9:30 Ry w/CO 120, H2:80 10:20 Ry off 6/2 8:59 5.3 0.5 80/550 30/60 80/105/50 6/2 8:59 5.3 0.5 HFK: 0.118 0cv 0.97 9:08 Skg: 7.66 HFK: 0.118 0cv 0.97 6/5 8:23 55 0.48 26/62 80/550 80/115/2 6/15 8:23 55 0.48 26/62 80/550 80/115/2 6/16 8:00 6-3 0.48 28/64 80/550 20/115/2 6/16 8:00 6-3 0.48 28/64 80/550 20/115/2 10:40 CO 373 10:55 Ry w/co + 2°/6 air 10:55 Ry w/co + 4% air	Colin	2:~	Λ	Δ, 5	160 1930) 2/00
6/10 8:18 5.6 0.5 (60/550 30/60 0410) 6/10 23:00 100 ppm 60 + 6 hair ock 0.97 23:45 CO 380 entered on wrong pg 10:20 Ry w/CO 120, H2 80 10:20 Ry w/CO 120, H2 80 10:20 Ry off 6/12 8:50 30/60 80/105/12 10:20 Ry off 10:20		ρ , ρ	5K17.	1.62 11	rk.o.ne	- / A
23: 45 CO 3 fb man 5 m m 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2				4	11 1565	30/60 00/10/
13: 45 CO 3 fb Indias 5 th and 5 ft 16/11 8:51 Slv: 7.72 HPR: 0.117 9:30 Ry w/CO : 120 , Hz . 80 10:20 Ry off 6/12 8:59 5,3 0.5 80/550 30/60 80/105/ft 9:08 Slb: 7.66 HPR: 0.118 0CV: 0.91 16/15 8:23 5.5 0.48 26/62 80/550 80/105/ft 16/15 8:00 6-3 0.48 28/64 80/550 50/105/ft 16/16 8:00 6-3 0.48 0.48 0.48 0.48 0.48 16/16 8:00 6-3 0.48 0.48 0.48 0.48 0.48 0.48 16/16 8:00 6-3 0.48		(3:00	100 PP	m to th	, to air	000017
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5/6 7.7(HPR 0~111 00.00 555 Ry w/co + 2°/0 air 10:40 Co off 12:05 Ry w/co + 1% air 1:05 Ry w/co + 6°/0 air 1:15 Ry w/co + 6°/0 air	6//	() ()		0.48	28/67	OCN 0.97
8:55 Ry w/co + 2% au 10:40 CO 033 12:05 Ry w/co + 1% au 1:05 Ry w/co + 6% au 1:19 Ry w/co + 6% au	/ 0		RG 7	-7(000
1:05 Ry w/C0 + 4% air 1:05 Ry w/C0 + 6% air 1:19 Ry w/C0 + 6% air		<u></u>	_	1/co + 2	°/0 ar	
1:05 Ryw/C0 + 4% air 1:05 Ryw/C0 + 6% air			Ce	0 0/1	. 9/ /	
1:05 Rij w (CO + 6% air			lef	w/co +	4% ais	
2:15 Ry w/Co + 6% au			Rif	w/CO d	M	
3;15 Rg 88 Cont on Pg 41			Rej	w/C0 +	6 % au	
Cont on pg 41		3,15	lif	88		
18 W PN Y 7				+ 00	-Dox-41	
	+		<u>'</u> %	IN PN	7 7	

Mo 2	Total 359 st 4-2
t/an2	
	dall/time (I Vall Fa PSta Te/Tentte
	6/17/8:00 6.0 0.49 80/530 34/62 80/105/90 86:7.53 HFR: 0.110 000: 0.97 9:20 100ppm CD 11:30 sccm, 1% Co: 0.8 sccm
	\$16:7.53 HFR: 0.116 OCU: 0.97
	9:20 100ppm CO 12:30 sccm, 1/6 Co: 0.8 sccm
·	10:24 60 7
5/80	11:25 100 ppm 60 + 2 % air
2/	17:18 (000)
<u>'</u>	1:50 100 ppm co + 4% aus
	13:18 (00 27) 1:50 100 ppm co + 4% aus 3:00 60 off - Quereased to 160 5cm
	00
	6/18 8:04 MIA @ 0.39V 160/550 30/00 80/108 /90
	SRG 7.75 HER 0-112 OCV 0.97
~	10:45 100ppm CO
	11:35 CO OPA
	1:45 100ppm Co 12% air
	1.55 (00)
	15 Shitting dwn to repair Station
	1:55 Coopy 1:55 Coopy 1:55 Shitting dwn to repair Dation 6/27 Station Repaired cell back on Dine 6/23 8:13 6:4 n 0:5 160/550 35/55 80/105/90
	6/23 8:13 6:4 n 0:5 160/550 35/55 80/105/90
	6/23 8:13 6.4 7.0.5 160/550 35/55 &/105/90 8:16 SRG: 4:34 HFR: 0.111 OCV: 0.99
	9°, 25 100 pp in Co
	10:35 60 578
1/	12:50 100ppm Co + 2% air
	2.05 60 78
	3:00 Co + 9% air
	3:37 Co off
	4:33 100ppm C0 + 6% air
	6/24 9:30 Computer croshed
	9158 575 0.49 160/550 40/60 80/105/90
	10:00 SRG: 7.69 HFR:0.107 OCV: 0.97
	2.00 Ry w/CD
	2:45 Beg 088
1	Cont on 19 55 total
	William Maria Constitution of the Constitution

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imi		date frim	Cal Va	.00 C	PS11-	Total
		6/15 8:00	1.7	ell G 5 B0/550	10/15	80/105/G
176		6/25 0.00	50(100	D 80/350	10/60	W/ 0 CO
10		0. 1	3KG: /11	HFR: 0.106	00	V: 0,91
150			Ref w/co: 122	,		
		9:45	Ref off Ref w/co +	9/		· · · · · · · · · · · · · · · · · · ·
•		11:20		2 /our	······································	
		1:10	Ref off			
		4:38	Ref w/co	120; H2:80	+ 4%	air (8 scom)
	7.	6/26 8:30	Ref w/co: 4.9 0.5 5RG: 7.69	80/550	10/60	80/105/00
			5RG: 7.69	HFR=0.105		0.01/0.97
		9:15	Ref W/CO+	-681 air		
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EXHIBIT F INVENTION DISCLOSURE

LUI 0 6 1999

FOR OFFICIAL USE ONLY

This Document May Contain Proprietary Or Restricted Information

Access to this document is provided only on a NEED-TO-KNOW basis.

NOTE: That attached invention disclosure is considered Business Sensitive information and is distributed on a "need to know" basis. If this information is released to personnel who do not have a "need to know," the chances of receiving a patent are greatly jeopardized.

Important Information regarding this Invention Questionnaire (i.e., statutory bars, upcoming disclosures, etc.) is highlighted on the attached Disclosure Data Entry Form if applicable.

Cy:
Bill Eklund, LC/BPL, D412
Bruce Cottrell, LC/BPL, D412
Sue Potter, LC/BPL, D412
IP-File



Comi realization Action Teams Disclosure Data Entry Form

Cas	Numb r
	S -

LAD# 99-088.

CAT Assignment: Materials

Title of Invention

FUEL CELL ANODE CONFIGURATION FOR CARBON MONOXIDE TOLERANCE USING NON-PRECIOUS CATALYSTS

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Disclosure Rec'd	by IPM:9/30/99			Date	Referred to CA	AT: 9/30/99	
Date LAD# Open	ied: 9/30/99	note that reflect new			CAT Decision Da	te:	
Disclosure Sent to		99	e o yair y		Case Attorn Notification Da		
Date Received S# fr	rom LC/BPL:			<u>Da</u>	te LAD Closed		
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.9/30/99 - Sent disclosure to LC/BPL for patent review

B&R c de

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Dev lopm nt Stage:

Reduced t practice yes n

ABOVE THIS LINE

UNIVERSITY OF CALIFORNIA
THE LOS ALAMOS NATIONAL LABORATORY
LOS ALAMOS, NM 87545

PLEASE DO NOT COMPLETE YANY INFORMATION

INVENTION DISCLOSURE

(consolidated Record of Invention and Invention Evaluation Questionnaire)

This invention was made in the course of or under prime Contract No. W-7405-ENG-36 between the U.S. Department of Energy and the Regents of the University of California. This Invention Questionnaire is an important legal document and should be fully and carefully prepared in accordance with the following instructions.

INSTRUCTIONS: 1) This Invention Disclosure will form the basis from which UC will determine whether to elect title to this invention and proceed to seek patent protection. It is important that you provide as much information as possible. 2) Please submit **completed** Disclosure to the Intellectual Property Management (IPM) team within the Civilian and Industrial Technologies Program Office (CIT-PO), MS C334. 3) The appropriate Group Leader(s) **must** sign the completed Disclosure before it is submitted for review.

If you have any questions, please call the Annabelle Torres at 667-8129 or Sharon Trujillo at 665-6708. IPM will coordinate the patent filing decision with Laboratory Counsel, Business and Patent Law (LC/BPL) and the appropriate Capability Access Team (CAT), and will contact you once this decision has been made. The answers to the following questions will be reviewed by the appropriate CAT and by LC/BPL. You may be contacted by LC/BPL or the CAT for additional information. Both will use this information to determine if a patent application will be filed on behalf of the University of California. Your answers should be in non-technical language as they will form the basis of this business decision.

Source of Funding (Pr _DOE/OTT	ogram or Agency):			
CRADA Work For Others	☐ User Facility ☐ LDRD		Technical Assistanc	_
DOE Program Director DOE B&R Code: E		Steve Chalk		·
Please provide input re (Refer to the Capability	garding the category to Access Team Referen	nis invention best ce Guide for furth	represents. er details)	
Check only ONE:	□⊠ Materials	☐ Computing	☐ Chemistry	
(Rev. 8/98)	PROPRIETARY Dissemination or Disclose	INFORMATION TO ROSE (AM 721)		CIT-PO/LC/BPL

	Bioscienc	☐ Engin	ering	&	Physical	Science
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Invention Information

1. **Title of Inv ntion** (indicate briefly the name of the article, device, material, composition, or process) Fuel Cell Anode Configuration For Carbon Monoxide Tolerance Using Non-precious Catalysts.

2. **Discloser(s):** The list should include all individuals who are believed to have made an original contribution to the inventive concept and a substantial contribution to its reduction to practice. When in doubt, it is best to include a person rather than exclude a person. The final determination of inventorship will be made by LC/BPL after the invention is defined and after discussion with the disclosers listed below.

		Home		
MS	Phone	Address	Employer	Z#
D42 9	7-3964	352 joya Loop Los Alamos NM 87544	LANL	109906
D42 9	7-0925	120 Sierra Vista Los Alamos NM 87544	LANL	103906
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	D42 9	D42 7-3964 9 7-0925	MS Phone Address D42 7-3964 352 joya Loop 9 Los Alamos NM 87544 D42 7-0925 120 Sierra Vista 9 Los Alamos NM	MS Phone Address Employer D42 7-3964 352 joya Loop Los Alamos NM 87544 LANL D42 7-0925 120 Sierra Vista Los Alamos NM LANL

3. Attach a description of the Invention. Include as many pages and attachments as needed to fully describe your invention, and how it differs from the state of the art, including any experimental protocols and results. You should also attach copies of notebook pages and other written documents that are pertinent to the invention.

Suggested Format:

- A. Brief non-technical abstract of the Invention
- B. Background of the Invention, including a statement of the problem(s) to be overcome and previous attempts to solve these problems (include reference materials on the problem(s) and the attempted solution(s)).
- C. Statement of Invention (what did you invent and what are the advantages)
- D. Detailed description of the Invention (include drawings, photos, graphs, etc.) in sufficient technical detail for the reader to understand the invention.
- 4. Dates and Places of Invention:
 - a) Conception of Invention: 25 March 1997 at MST-11 (LANL)

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		(date)	•	(\	where)

(Give the earliest date on which, and the place where, the invention was suggested, even if not complete. If the invention includes several inventive concepts, give the conception date of each and clearly identify the contributor(s) of each element).

	·
b) Page	
(Gi	(date) (place) (number) ive the date of the earliest record that is available)
c) Page	First Written Description: 10 sept. 1997 at MST-11 in Notebook Fuel Cell No. 2
	(date) (where) (number) (Give the date of the earliest record that is available)
d)	Completion of Model or Full Size Device: 1 Oct. 1997 a t MST-11 (date) (where)
e)	First Test or Operation of Invention: 2 Oct. 1997 at MST-11 (date) (where)
	Degree of success attained (List successive dates if successive results are available)
2 (Oct 1997, 15 Oct 97, 23 Oct. 1997, 30 Oct. 1197, 4 Nov. 1997, 10 Nov 1997, 14 Nov.
1997	, 19 Nov. 1997 , 3 Dec. 1997, 21 Jan. 1998, 29 Jan. 1998 , 23 June 1998
5. a)	What is the present stage of development of this Invention? (Please check one)
	Concept (A bare idea with sufficient thought to provide initial direction toward a reduction to practice)
	☐ Bench Design (An initial test of a complete Invention using laboratory resources; not engineered)
	Lab Prototype (An engineered design that incorporates the complete Invention, but not engineered to use in its intended environment)
	☐ Lab Testing (Sufficient testing to obtain proof-of-principle verification)
	X Field Prototype (An engineered design that may be used outside the laboratory in its intended environment)
	Ready for Transfer (An engineered and tested process or equipment with test results to demonstrate the capabilities of the Invention)
b)	Have you achieved "actual" reduction to practice? (i.e. did you achieve the desired result operating machine, desired material, process control in accordance with the description of the Invention provided above)
	YesX No If yes, what was the date? 2 Oct 1997
c)	For the stage of development chick diabove, what additional ffort (tasks,

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d) 	If additional effort is Invention to the next			ded to ac	dvance the
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a)	Disclosure of the Inve	ention to O	thers (Include othe	er UC/LAN	NL staff):
a) —	Disclosure of the Inve	Date (MM/DD/YY)	Where Disclosure Was Made	Was Th Proprie	nis covered by a tary Information
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T.	Name/Organization	Date (MM/DD/YY)	Where Disclosure Was Made	Was Th Proprie	nis covered by a tary Information
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1. 2. 3.	Name/Organization	Date (MM/DD/YY) 3/18/98 cuments, por have publicated external (this	Where Disclosure Was Made Los Alamos, NM (details not disclosed) ublications and prelished or prepared whether each disclord parties with no obli	esentation for publication of r	nis covered by a tary Information ement (PIA)? Is describing cation, or internal (withing ion-disclosure)

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OAAT/DOE Program Review	18 March 1998	Int	written
: '			
 c) List related publications (by problems and/or features disculations (including disclosure etc.) — attach copies if availabilities to the described Inventions. 	ssed in your description on es, patent applications, iss le. Also, provide a brief st	of the Invention to the sued patents, and the sued patents, and the sued patents, and the sued to the	on and other , journal articles,
Title/Subject	Author(s)	P	ublication/Dat
I. Fuel Cell Anode Configuration For and S. Gottesfeld . Patent Application.	on, Jan 1999	, T. Zawodzii	nski, M.S. Wilson
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Relationship (recognition of an invention) to the described invention is also related to	ention (Refer to the public	ation number	r above i.e. 1.2.3.4)
metal catalysts.			•
 Are there other R&D efforts subject matter of this Inventi Questionnaires or patent app subject matter, PI name, and the 	on that may not be re lications to be filed?	ady for Inve If so, please	ention provide the
			,

8. a) Under what specific project(s) (CRADA, Work for Others, User Facility, DOE, DoD, T chnical Assistance, LDRD, tc.) did this Inv ntion aris ?

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	he invention will be the subject of tech transfer activities and will be of interest ther agencies.
c) _	Will this Invention be used as a basis for starting a new project? Yes No _X_ Unsure If not, is there a potential use of this Invention on other projects? Please explain.
-	
9. V p	Vill the government (e.g. DOE, DoD, or other Federal Agencies) purchase roducts or processes covered by the Invention? Yes No
lf	known, state actual or potential amount of procurement
_	
_	
	What commercial entities (non-government) might be interested in sponsoring further development of this Invention? Fuel Cell manufacturers or fuel cell materials manufactures (Plug Power, Gore
Enei	rgy Partners, IFC)
-	Was the Invention funded by, or is it primarily useful in connection with government programs directed at: the storage of civilian radioactive wast
	uranium enrichment; United States Advanced Battery Consortium; DOE Steel or Metals Initiative; or, is it subject to an international agreement or funded by EPRI or GRI? Yes NoX_ If yes, provide details.

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	sks. List existing regula	ations which cou	ild impede imple	mentation of this	s Invention.
In	re you aware of any vention or any relate cribe the nature of the s	ed technologie	ublic sensitiv	ities with regar No _X If ye	d to this es, please
	cial Potential	had table (An	nondiy A) oo	completely so	naosibla
(Instr	se fill out the attach uctions are provided in	Appendix A)	pendix A) as	completely as	possible.
Are non-	you interested in co LANL capacity)? Ye	ommercializing	this Invention X If Yes, p	n yourself (in lease provide co	a mments:
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THIS DOCK ENT CONTAINS PRIVILEGED IN PRIMATION

Plug Power , Gore			
19. This Invention Questionnaire was Francisco A. Uribe	completed by:	·	
Name	TSM Position/Title	3/9/1999 Date	
	1 Osmon Title	Date	
Thomas A. Zawodzinski Jr.	TSM	_3/9/1999	
Name	Position/Title	Date	

Discloser(s)/Line Manager Signature(s)

20. Each discloser needs to sign and date the Invention Questionnaire. If license income is generated as a result of this Invention, a portion of the income is returned to the division. Therefore, it is necessary to identify the Division to which the discloser(s) was(were) assigned at the time that 1) the Invention was conceived or first reduced to practice, 2) the software or other copyrighted work was authored, or 3) the mask work was created.

The line manager of the discloser(s) must review the Invention Questionnaire and sign-off indicating that he/she believes the technology to be sound and recommends that the University of California should seek patent protection.

I/We have reviewed this Invention Questionnaire and recommend that it be considered for a patent application:

<u>SIGNATURES</u>	<u>Date</u>	Group	<u>Identified</u> Division
Discloser Signature: Francisco A'Unibe	9/24/99	MST.11	MS7
Discloser's Line Manager Signature:	1/24/99	MST-11	
Disclos r Signature	9/24/99	MGT-12	

PROPRIETARY INFORMATION Dissemination or Displosure Restricted (AM 721)

Discloser's Line Manag Signature:	1/24/99	MST-11	
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Appendix A: Technology Comparison Matrix

<u>Instructions for filling out the table:</u> (Response to Question 13 of the Invention Questionnaire)

- What are the PRIMARY commercial (non-government) uses or applications (foreign or domestic) for this Invention?
- What are the closest related technologies that are currently used for these applications?
- Which industry uses existing technology or is a potential user of this Invention for these specific applications?
- Are there any OTHER uses or applications, besides what is listed as primary (be creative, but realistic)? Include the same information (closest related technologies, industry sectors/markets).

	This Invention	Closest Related Technologies	Markets in which this Application May Be Applied
Primary Application(s)			
Other			
Other Applications			

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